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10/563,461

01/05/2006

Warren Smook

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EXAMINER

LEWIS, TISHA D

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/563,461  
Filing Date: January 05, 2006  
Appellant(s): SMOOK ET AL.

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H. James Voeller  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 1/18/2011 appealing from the Office action mailed 8/18/2010.

**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The following is a list of claims that are rejected and pending in the application:

Claims 1-13, 15 and 16

**(4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the

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subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

**(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

**(8) Evidence Relied Upon**

WO 02/079644 A1 10-10-2002 (equivalent to U.S. patent 6872049, Christensen 3-2005)

WO 02/14690 A1 2-21-2002 (equivalent to U.S. patent 7011598, Flamang et al 3-2006)

WO 03/014566 A1 2-20-2003 (equivalent to U.S. patent 7090465, Flamang et al 2-2003)

WO 01/57398 A1 8-9-2001 (equivalent to U.S. publication 20030123984, Wilde et al 7-2003)

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/079644 (U.S. patent 6872049) in view of WO 0157398 (US publication 20030123984). As to claim 1, WO '644 discloses a sun (14), planet (17) and ring gears (7) and a planet carrier (5), the carrier having circumferentially spaced studs (5b) which support a bogie plate (21), the bogie plate providing support for circumferentially spaced shafts (19) which supports and locates circumferentially spaced planet gear bearings (25) on which the planet gears are mounted. WO' 644 doesn't disclose the bearings being taper roller bearings.

WO' 398 discloses a planetary gear transmission having a sun, planet and ring gear and a carrier wherein circumferentially spaced shafts (30) support and locate circumferentially spaced planet gear bearings (32) in the form of taper roller bearings on which the planet gears are mounted.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace the bearings of WO' 644 into taper roller bearings in view of WO' 398 to better distribute contact pressure of the rollers due to inclined direction of loading which increases the amount of material available for distributing the load in the interaction with the loads coming from the gears (also see WO' 398 paragraphs [0025] to [0029] for further reasons for using taper roller bearings).

As to claim 2, WO' 644 discloses the planet gears arranged in axially aligned pairs (17a, 17b are at least two sets).

As to claim 3, WO' 644 discloses the bearings (25) supporting the pairs of aligned planet gears.

As to claim 4, WO' 644 discloses two pairs of each set positioned on opposite sides of the plate (17a and 17b are on opposite sides of plate 21).

As to claim 5, WO' 644 in view of WO '398 discloses the planet gears being each mounted on a pair of roller bearings (in Figure 3 of WO '644, 25 has separate bearings formed into a pair for 17a and 17b) and in view of WO '398 which teaches that taper bearings can be used as the pair of roller bearings.

As to claim 6, WO' 644 in view of WO' 398 discloses a pair of tapered roller bearings arranged in an O configuration (WO' 398, paragraph [0026] discloses that two tapered bearings in O-arrangement results in better stability).

As to claim 7, WO' 644 discloses the bearings being supported by a shaft (19) which self adjust in an angular position relative to the plate.

As to claim 8, WO' 644 discloses the bearings for some of the planets being supported on a shaft (not referenced) rigidly secured to the bogie plate.

As to claim 9, WO' 644 discloses each shaft rigidly secured to the plate.

As to claims 10, 15 and 16, WO' 644 discloses the bogie plate (21) being able to deform elastically (slightly resilient) to allow self adjustment of the angular position of each shaft relative to the axis of rotation of the ring gear.

As to claim 11, WO' 644 discloses a main bearing (27) having an inner ring bearing surface (27b) of a diameter greater than that of a toothed surface of the ring gear.

As to claim 12, WO' 644 discloses the carrier (5) having a radially extending torque path which is torsionally stiff (due to bolting to hub) but relatively compliant in an axial direction parallel with the axis about which the forces act.

Claims 1-13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/14690 (U.S. patent 7011598) in view of WO 0157398 (US publication 20030123984). As to claim 1, WO' 690 discloses (see Figure 4) a sun, planet and ring gears and a planet carrier, the carrier having circumferentially spaced studs (42) which support a bogie plate (21), the bogie plate providing support for circumferentially spaced shafts (44) which supports and locates circumferentially spaced planet gear bearings on which the planet gears are mounted. WO' 690 doesn't disclose the bearings being taper roller bearings.

WO' 398 discloses a planetary gear transmission having a sun, planet and ring gear and a carrier wherein circumferentially spaced shafts (30) support and locate circumferentially spaced planet gear bearings (32) in the form of taper roller bearings on which the planet gears are mounted.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace the bearings of WO' 690 into taper roller bearings in view of WO' 398 to better distribute contact pressure of the rollers due to inclined direction of loading which increases the amount of material available for distributing the load in the interaction with the loads coming from the gears (also see WO' 398 paragraphs [0025] to [0029] for further reasons for using taper roller bearings).

As to claim 2, WO' 690 discloses the planet gears arranged in axially aligned pairs (Figure 4).

As to claim 3, WO' 690 discloses the bearings supporting the pairs of aligned planet gears (Figure 4).

As to claim 4, WO' 690 discloses two pairs of each set positioned on opposite sides of the plate (Figure 4).

As to claim 5, WO' 690 in view of WO '398 discloses the planet gears being each mounted on a pair of roller bearings (Figure 4 of WO' 690) and in view of WO '398 which teaches that taper bearings can be used as the pair of roller bearings.

As to claim 6, WO' 690 discloses the tapered roller bearings arranged in an O configuration (claim 21).

As to claims 7 and 13, WO' 690 discloses the bearings being supported by a shaft (26 flexpin shaft) which self adjust in an angular position relative to the plate.

As to claim 8, WO' 690 discloses the bearings for some of the planets being supported on a shaft (not referenced) rigidly secured to the bogie plate.

As to claim 9, WO' 690 discloses each shaft rigidly secured to the plate.

As to claims 10, 15 and 16, WO' 690 discloses the bogie plate being able to deform elastically to allow self adjustment of the angular position of each shaft relative to the axis of rotation of the ring gear.

As to claim 11, WO' 690 discloses a main bearing having an inner ring bearing of a diameter greater than that of a toothed surface of the ring gear (claim 3).



As to claim 12, WO' 690 discloses the carrier having a radially extending torque path which is torsionally stiff but relatively compliant in an axial direction parallel with the axis about which the forces act (claim 6).

Claims 1-13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/014566 (U.S. patent 7090465) in view of WO 0157398 (US publication 20030123984). As to claim 1, WO' 566 discloses (see claim 1) a sun, planet and ring gears and a planet carrier, the carrier having circumferentially spaced studs (42) which support a bogie plate (21), the bogie plate providing support for circumferentially spaced shafts (44) which supports and locates circumferentially spaced planet gear bearings on which the planet gears are mounted. WO' 566 doesn't disclose the bearings being taper roller bearings.

WO' 398 discloses a planetary gear transmission having a sun, planet and ring gear and a carrier wherein circumferentially spaced shafts (30) support and locate circumferentially spaced planet gear bearings (32) in the form of taper roller bearings on which the planet gears are mounted.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace the bearings of WO' 566 into taper roller bearings in view of WO' 398 to better distribute contact pressure of the rollers due to inclined direction of loading which increases the amount of material available for distributing the load in the interaction with the loads coming from the gears (also see WO' 398 paragraphs [0025] to [0029] for further reasons for using taper roller bearings).

As to claim 2, WO' 566 discloses the planet gears arranged in axially aligned pairs (claim 2).

As to claim 3, WO' 566 discloses the bearings supporting the pairs of aligned planet gears (claim 2).

As to claim 4, WO' 566 discloses two pairs of each set positioned on opposite sides of the plate (claim 3).

As to claim 5, WO' 566 in view of WO '398 discloses the planet gears being each mounted on a pair of roller bearings (claim 19 of WO' 566) and in view of WO '398 which teaches that taper bearings can be used as the pair of roller bearings.

As to claim 6, WO' 566 discloses the tapered roller bearings arranged in an O configuration (claim 27).

As to claims 7 and 13, WO' 566 discloses the bearings being supported by a shaft (26 flexpin shaft) which self adjust in an angular position relative to the plate (claim 4).

As to claim 8, WO' 566 discloses the bearings for some of the planets being supported on a shaft (Figure 4) rigidly secured to the bogie plate.

As to claim 9, WO' 566 discloses each shaft rigidly secured to the plate (Figure 4).

As to claims 10, 15 and 16, WO' 566 discloses the bogie plate being able to deform elastically to allow self adjustment of the angular position of each shaft relative to the axis of rotation of the ring gear (claims 1 and 4).

As to claim 11, WO' 566 discloses a main bearing having an inner ring bearing of a diameter greater than that of a toothed surface of the ring gear (claim 10).

As to claim 12, WO' 566 discloses the carrier having a radially extending torque path which is torsionally stiff but relatively compliant in an axial direction parallel with the axis about which the forces act (claim 13).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO' 644 in view of WO' 398 as applied to claim 1 above, and further in view of WO' 690 and WO' 566). WO' 644 in view of WO' 398 disclose the planet gears supported to the bogie plate by a shaft, but does not disclose the shaft being of a flexpin.

Both WO' 566 and WO' 690 references disclose a shaft (26) being of a flexpin operation due to flexing of component (33).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the shaft (19) of WO' 644 in view of WO' 398 and further in view of both WO' 566 and WO' 690 references to isolate axial forces from the planet gears during operation.

#### **(10) Response to Argument**

The appellant argues that one of skill would recognize that although taper bearings are known and may provide advantages in certain cases, such advantages apply only to cylindrical bearings for a gear unit that does not include a bogie plate, however; although the carrier of the WO'398 art doesn't use a boogie plate, the advantages disclosed in that art (paragraphs [0023] to [0029]) for using taper bearings would lead one of skill in the art to recognize that taper bearings can be used for

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supporting planet gears mounted in any type of carrier. The WO' 398 art advantages are provided based on how the taper bearings support the planet gears and not based on the type of carrier being used.

In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, the teaching and suggestion to combine is found in the WO' 398 art which discloses multiple advantages (paragraph [0023] to [0029]) for using taper roller bearings for supporting planet gears used in a windmill gearbox which is the same type of gearbox used in the WO' 644 art.

The appellant argues that the mechanical (elastic, rigid) design differences between the WO' 644 art and the WO' 398 would be acknowledged by one of skill in the art who would not look to the WO' 398 art to use taper roller bearings in the WO' 644 art because of those design differences. However, although the designs of the carriers are different, the bearing support of the planet gears in both arts are the same (except for the type of bearings used) in which WO' 644 discloses spaced shafts (44) which supports and locates circumferentially spaced planet gear bearings (25) on which the

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planet gears (17) are mounted and WO' 398 discloses circumferentially spaced shafts (30) support and locate circumferentially spaced planet gear bearings (32) in the form of taper roller bearings on which the planet gears (33) are mounted.

The appellant argues that it is far from obvious that one of skill would simply decide to "substitute" the taper roller bearings of WO' 398 in the configuration of WO' 644. The Supreme Court in KSR reaffirmed the familiar framework for determining obviousness as set forth in *Graham v. John Deere Co.* (383 U.S. 1, 148 USPQ 459 (1966)), but stated that the Federal Circuit had erred by applying the teaching-suggestion-motivation (TSM) test in an overly rigid and formalistic way. KSR, 550 U.S. at \_\_\_, 82 USPQ2d at 1391. Specifically, the Supreme Court stated that the Federal Circuit had erred in four ways: (1) "by holding that courts and patent examiners should look only to the problem the patentee was trying to solve " (Id. at \_\_\_, 82 USPQ2d at 1397); (2) by assuming "that a person of ordinary skill attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem" (Id.); (3) by concluding "that a patent claim cannot be proved obvious merely by showing that the combination of elements was obvious to try" (Id.); and (4) by overemphasizing "the risk of courts and patent examiners falling prey to hindsight bias" and as a result applying "[r]igid preventative rules that deny factfinders recourse to common sense" (Id. ).

In KSR, the Supreme Court particularly emphasized "the need for caution in granting a patent based on the combination of elements found in the prior art," Id. at \_\_\_, 82 USPQ2d at 1395, and discussed circumstances in which a patent might be determined to be obvious. Importantly, the Supreme Court reaffirmed principles based

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on its precedent that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at \_\_\_, 82 USPQ2d at 1395. The Supreme Court stated that there are “[t]hree cases decided after *Graham* [that] illustrate this doctrine.” *Id.* at \_\_\_, 82 USPQ2d at 1395. (1) “In *United States v. Adams*, . . . [t]he Court recognized that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *Id.* at \_\_\_, 82 USPQ2d at 1395. (2) “In *Anderson’s-Black Rock, Inc. v. Pavement Salvage Co.*, . . . [t]he two [pre-existing elements] in combination did no more than they would in separate, sequential operation.” *Id.* at \_\_\_, 82 USPQ2d at 1395. (3) “[I]n *Sakraida v. AG Pro, Inc.*, the Court derived . . . the conclusion that when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious.” *Id.* at \_\_\_, 82 USPQ2d at 1395-96 (Internal quotations omitted.). The principles underlining these cases are instructive when the question is whether a patent application claiming the combination of elements of prior art would have been obvious. The Supreme Court further stated that: When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way,

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using the technique is obvious unless its actual application is beyond his or her skill. *Id.* at \_\_\_, 82 USPQ2d at 1396. When considering obviousness of a combination of known elements, the operative question is thus “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *Id.* at \_\_\_, 82 USPQ2d at 1396. In this case, the claim structure of claim 1 is already known in the prior art via the WO' 644 art in which a spherical roller bearing is used to support the planet gears in a windmill gearbox. The appellant (as to claim 1) is altering the bearing support with another bearing support (taper bearing) known in the field via the WO' 398 art. The advantages given in the WO' 398 art (paragraph [0023] to [0029]) for using taper roller bearings for supporting planet gears in a windmill gearbox suggest that appellant's improvement as recited in claim 1 would yield no more than a predictable result which is already known in the field via the WO' 398 art.

The appellant argues that one of skill in the art wouldn't use the taper roller bearings of the WO' 398 art in the WO' 644 art due to the rigid design and the advantages of the taper bearing not being applicable for the WO' 644 art. These arguments seem to be arguments against appellant's own invention, because if taper roller bearings as used in the WO' 398 art wouldn't work with the WO' 644 art (which uses the exact same transmission structure as appellant's, boogie plate included) then the same would be true for appellant's claimed transmission structure.

The appellant argues that the advantages given (at least two advantages, page 12, lines 1-5 and page 13, lines 17-24 of brief) for using taper roller bearings in the WO' 398 art would be the same advantages provided by the spherical bearings in the WO'

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644 art, so there would be no reason for the substitution. This argument suggest that the substitution would be simple, because if the same advantage is provided by both types of bearings, then the substitution would not modify the function/operation of the WO' 644 art transmission.

The appellant argues that the combined teachings of the WO' 644 art and WO' 398 art fail to disclose the limitations recited in the claim 5, specifically that the WO' 644 art only discloses one bearing per planet gear, not a pair of bearings as recited. However, although the WO' 644 art uses spherical bearings using a common inner and outer race, the two rows of bearings (25) within the races can be considered a pair of roller bearings since appellant doesn't further recite what the actual structure of the pair of bearings should have. Further, appellant argues that the mounting between the taper and spherical roller bearings are different and it wouldn't be obvious to substitute the two. This argument again seems to be an argument against appellant's own invention, because if the mounting of the taper roller bearings wouldn't work with the WO' 644 art, then the same would be true for appellant's claimed transmission structure.

The appellant argues that the combined teachings of the WO' 644 art and WO' 398 art fail to disclose the limitations recited in the claim 6, specifically that the O configuration in the WO' 398 art wouldn't be necessary and/or desired for the elastic design in the WO' 644 art due to the planet shafts being supported at one side by the boogie plate. This argument suggest that the substitution would be simple, because if that advantage (paragraph [0026] in WO '398 art) is unnecessary or undesired because the spherical bearings already provide it, then the taper roller bearing substitution would



not modify the function/operation of the WO' 644 art transmission because it would provide the same advantage in the O configuration arrangement as the spherical bearing.

Appellant's rule 132 Declarations filed 11/9/2009 and 1/18/2011: Appellant argues that the office fails to properly consider the supporting evidence contained within the declaration, however; the examiner properly considered and responded to the declaration via the office actions filed 8/18/2010 and 3/8/2010. Appellant's declarations as filed describes the reasoning for using taper bearings over the prior art spherical bearings, why taper bearings were considered not workable at the time the invention was filed and uses the prior art references (WO' 644, WO' 566 and WO' 690) cited in the rejections as support (the examiner assumes the filing date of these arts as factual evidence) for why taper roller bearings were not considered workable at the time the invention was made. The problem with these declarations is that the statements are purely argumentative and not factually supported according to MPEP 716.01 (c) [R-2] and 716.02. There is no factual evidence supporting appellant's showing of unexpected results gleaned from the use of taper roller bearings compared to the prior arts spherical roller bearings due to degrees of freedom. Appellant attempts to use the prior art references (as disclosed above) as support to show that these degrees of freedom were known and due to taper roller bearings having limited degrees of freedom, spherical bearings were preferred up to the time of the present invention's filing. This is not factual support either, because although the prior art references use spherical bearings,

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they are silent as to appellant's "degrees of freedom" statements and the preferable use of spherical bearings over other types of bearings (in particular, taper roller bearings).

The remaining rejections, according to appellant, is argued using the same arguments as disclosed against the first rejection and the examiner's responses to the arguments for the first rejection would also apply to the remaining rejections as well.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/TISHA D. LEWIS/ /T. D. L./

Primary Examiner, Art Unit 3655

March 7, 2011

Conferees:

/David D. Le/

Supervisory Patent Examiner, Art Unit 3655

/MJ/ Marc Jimenez TQAS TC 3600